

IN THE CLAIMS:

1. – 8. Canceled.

9. (Previously Presented) A method operable to detect ultrasonic surface displacements on a surface of a remote target comprising:

- directing a first pulsed laser beam at the surface of the remote target to detect ultrasonic surface displacements;
- scattering the first pulsed laser beam with the ultrasonic surface displacements to produce phase modulated light;
- collecting a portion of the phase modulated light scattered by the surface of the remote target;
- optically amplifying the collected phase modulated light; and
- processing the phase modulated light to obtain data representative of the ultrasonic surface displacements at the target.

10. (Previously Presented) The method of Claim 23, wherein the second pulsed laser beam is applied coaxially with the first pulsed laser beam.

11. (Original) The method of Claim 9 wherein the step of optically amplifying the phase modulated light is accomplished using a multi-pass optical amplifier.

12. (Original) The method of Claim 9 wherein the step of optically amplifying the phase modulated light is accomplished using a doped fiber optic carrier coupled to an optical pump.

13. (Original) The method of Claim 9 wherein the step of processing the phase modulated light comprises:

- using an interferometer to demodulate the phase modulated light to create at least one optical signal;
- converting the at least one optical signal into at least one digital signal; and
- using a digital signal processor to process the at least one digital signal.

14. (Original) The method of Claim 13 wherein the step of converting the at least one optical signal into at least one digital signal comprises:

converting the at least one optical signal into at least one analog signal; and  
converting the at least one analog signal into at least one digital signal.

15. (Original) The method of Claim 9 further comprising processing the data representative of the ultrasonic surface displacements to determining a location of flaws or an discontinuities at the target.

16. (Previously Presented) A system operable to detect ultrasonic surface displacements occurring on a surface of a target comprising:

- a detection laser to generate a first pulsed laser beam to detect the ultrasonic surface displacements at the target;
- collection optics for collecting phase modulated light from the first pulsed laser beam scattered by the target;
- an optical amplifier to amplify the phase modulated light collected by the collection optics;
- an interferometer to process the phase modulated light and generate at least one output signal; and
- a processing unit to process the at least one output signal to obtain data representative of the ultrasonic surface displacements at the target.

17. (Original) The system of Claim 16 further comprising an optical amplifier to amplify the first pulsed laser beam generated by the detection laser prior to directing the first pulsed laser beam upon the target.

18. (Original) The system of Claim 16 further comprising an optical ranging unit to calculate a distance by which the target is separated from the system.

19. (Original) The system of Claim 16 further comprising a generation laser to generate a second pulsed laser beam to induce the ultrasonic surface fluctuations, and wherein the second pulsed laser beam is applied coaxially with the first pulsed laser beam.

20. (Original) The system of Claim 16 wherein the optical amplifier is multi-pass optical amplifier.

21. (Original) The system of Claim 16 wherein the optical amplifier is comprised of a doped fiber optic carrier and an optical pump coupled thereto.

22. (Previously Presented) The method of Claim 9, further comprising generating ultrasonic surface displacements at the surface of the remote target.

23. (Previously Presented) The method of Claim 22, wherein a second pulsed laser is applied to the surface of the remote target to generate the ultrasonic surface displacements.

24. (Previously Presented) The method of Claim 22, wherein a transducer is applied to the surface of the remote target to generate the ultrasonic surface displacements.

25. (Previously Presented) The method of Claim 9, further comprising preventing reflected phase modulated light feedback into an optical amplifier with at least one optical isolation assembly placed in the path of propagation of the phase modulated light which has been collected.

26. (Previously Presented) The system of Claim 16, further comprising at least one optical isolation assembly placed in the path of propagation of the scattered phase modulated light collected by the collection optics operable to prevent reflected laser light feedback into optical amplifier.

27. (Previously Presented) The system of Claim 16, further comprising a transducer operably coupled to the target wherein the transducer is operable to generate ultrasonic surface displacements at the surface of the target.